

101538063
JC17 Rec'd PCT/PTO 09 JUN 2005

IN THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A sampling Sampling device wherein it comprises in comprising:

a substrate [[,]] ;

a wave guide core in the substrate, capable of transporting the wave guide core being configured to transport a light wave [[E]] ; and

an optical cladding in the substrate,

wherein at least one a portion of the cladding surrounding surrounds at least one a portion of the core in a zone called the zone of interaction [[I]], the said zone comprising among others a grating capable of coupling configured to couple, in the cladding, a part of the light wave to form a coupled wave,

the coupled part of the wave being called coupled wave, the wherein a refractive index of the cladding being is different from the a refractive index of the substrate and the refractive index of the cladding is lower than the a refractive index of the core at least in the a part of the cladding next adjacent to the core in the zone of interaction.

2. (Currently Amended) The sampling Sampling device of claim 1, further comprising a a first recovery and treatment element,

wherein the cladding of the device is optically connected to a the first recovery and treatment element and the first element is configured to recover and treat of all or part at least a portion of the coupled wave.

3. (Currently Amended) The sampling Sampling device of claim 1, further comprising a a second first recovery and treatment element,

wherein the core of the device is optically connected to a the second recovery and treatment element and the second element is configured to recover and treat of all or part of the at least a portion of a non coupled wave in the cladding.

4. (Currently Amended) The sampling Sampling device of claim 1, wherein after the zone of interaction the core and the cladding are spatially separated after the zone of interaction separate.
5. (Currently Amended) The sampling Sampling device of claim 1, wherein the cladding and the core of the device are optically connected to a same recovery and treatment element comprising a set of optical elements.
6. (Currently Amended) The sampling Sampling device of claim 2, wherein the first recovery and treatment element of all or part of the coupled wave, comprises an optical element directly positioned directly at one an end of the cladding.
7. (Currently Amended) The sampling Sampling device of claim 2, wherein the first recovery and treatment element of all or part of the coupled wave, comprises a second zone of interaction and an optical element, wherein the second zone of interaction being is formed in the substrate, for by a second guide core located in a portion of the cladding and for by a second grating capable of coupling configured to couple, in the second core, the coupled wave in the cladding, wherein the said second core being is optically connected to the optical element outside of this said second zone of interaction.
8. (Currently Amended) The sampling Sampling device of claim 7, wherein the first core and the second core cores are decentred with respect to one each other in the cladding and/or the cladding comprises a variation of section from one zone of interaction to the other.
9. (Currently Amended) The sampling Sampling device of claim 3, wherein the second recovery and treatment element comprises an optical element connected to the core of the device.
10. (Currently Amended) The sampling Sampling device of claim 5, wherein the an optical element in the set of optical elements is a photo-detector or a group of photo detectors possibly associated to a formatting element.

11. (Currently Amended) The sampling Sampling device of claim 1, wherein the grating of a ~~the~~ zone of interaction is formed in the guide core, and/or in the cladding, and/or in the substrate, or in any combination thereof.

12. (Currently Amended) The sampling Sampling device of claim 1, applied to the fabrication of an optical amplifier, of claim 1, wherein it the sampling device is optically connected to the ~~an~~ output of an optical amplification element.

13. (Currently Amended) The sampling Sampling device of claim 12, wherein it is capable of acting as gain flattener the sampling device is configured to flatten a gain at the output of the amplification element.

14. (Currently Amended) The sampling Sampling device of claim 1, applied to the fabrication of a linear filter of claim 1, wherein the zone of interaction conjointly performs filtering and sampling.

15. (Currently Amended) A fabrication Fabrication method of an integrated optics sampling device of claim 1 comprising a substrate; a wave guide core in the substrate, the wave guide core being configured to transport a light wave; and an optical cladding in the substrate, wherein at least a portion of the cladding surrounds at least a portion of the core in a zone of interaction comprising a grating, the method comprising:

~~, wherein the one or more cores and the cladding are created respectively~~

~~creating the one or more cores core and the cladding for a modification of by modifying the refractive index of the substrate so as that in at least in the a part of the cladding next to the core and that at least in at least the corresponding zone of interaction, the a refractive index of the cladding is different from the a refractive index of the substrate and the refractive index of the cladding is lower than the a refractive index of the core; and~~

~~creating in that the corresponding the grating is created by a modification of by modifying the an effective index of the substrate.~~

16. (Currently Amended) The fabrication Fabrication method according to claim 15, wherein the modification of modifying the refractive index of the substrate is obtained by

~~radiation and/or by introduction of ionic species comprises irradiating the substrate, introducing ionic species into the substrate, or both.~~

17. (Currently Amended) The fabrication Fabrication method of claim 16, wherein it comprises the following steps: comprising:

- a) ~~introduction of introducing~~ a first ionic species in the substrate ~~so as to permit the optical cladding to be obtained after step e),~~
- b) ~~introduction of introducing~~ a second ionic species in the substrate ~~so as to permit the guide core(s) to be obtained after step e),~~
- c) burying of the first and/or second ionic species ions introduced in steps a) and b) so as to obtain the cladding and the guide core(s),
- d) formation forming of the one or more gratings.

18. (Currently Amended) The fabrication Fabrication method of claim 17, wherein the ~~introduction of introducing~~ the first and/or second ionic species is carried out by an ionic exchange or by ionic implantation.

19. (Currently Amended) The fabrication Fabrication method of claim 17, wherein the substrate is ~~made of~~ comprises glass and contains Na⁺ ions, and the first and the second ionic species are Ag⁺ ~~and/or~~ ions, K⁺ ions, or both.

20. (Currently Amended) The fabrication Fabrication method of claim 17, wherein step a) introducing the first ionic species in the substrate comprises: the creation of
~~creating a first mask comprising a pattern capable of obtaining configured to form the cladding, and the first ionic species being introduced~~
~~introducing the first ionic species through this the first mask, and step b)~~
wherein introducing a second ionic species in the substrate comprises:
~~the elimination of eliminating the first mask, and~~
~~the creation of creating a second mask comprising a pattern capable of obtaining the core(s) configured to form the core, and~~
~~introducing the second ionic species being introduced through this the second mask.~~

21. (Currently Amended) The fabrication method of claim 15, wherein ~~the grating(s) are obtained forming one or more gratings comprises introducing by introduction of ionic species through a same mask permitting the core(s) and/or cladding to be obtained used to form the core and/or the cladding~~ or by a specific mask.

22. (Currently Amended) The fabrication ~~Fabrication~~ method of claim 15, wherein ~~the grating(s) are obtained by localised heating forming one or more gratings comprises heating locally the substrate.~~

23. (Currently Amended) The fabrication ~~Fabrication~~ method of claim 15, wherein ~~the grating(s) are obtained by forming one or more gratings comprises etching of the substrate next to in the vicinity of the corresponding~~ zone of interaction.

24. (Currently Amended) The fabrication ~~Fabrication~~ method of claim 17, wherein ~~the first ionic species is buried at least partially before step b) burying the first ionic species is at least partially performed before introducing the second ionic species in the substrate and the first and second ionic species are buried after step b) burying the first ionic species and the second ionic species is performed after introducing the second ionic species in the substrate.~~

25. (Currently Amended) The fabrication ~~Fabrication~~ method of claim 17, wherein ~~the first ionic species and the second ionic species are buried after step b) burying the first ionic species and the second ionic species is performed after introducing the second ionic species in the substrate.~~

26. (Currently Amended) The fabrication ~~Fabrication~~ method of claim 17, wherein ~~at least part of the burying takes place with the application of an electrical field comprises applying an electrical field.~~

27. (Currently Amended) The fabrication ~~Fabrication~~ method of claim 17, wherein ~~at least part of the burying takes place by re diffusion in an ionic bath the burying comprises re-diffusing the ionic species in an ionic bath.~~

28. (Currently Amended) The fabrication Fabrication method of claim 17, wherein ~~all or part of the burying takes place by~~ comprises depositing at least one layer on ~~the a~~ surface of the substrate.

29. (Currently Amended) The fabrication Fabrication method of claim 17, wherein ~~the first ionic species and/or the second ionic species are introduced~~ introducing the first ionic species and/or the second ionic species comprises applying ~~with the application of~~ an electrical field.

30. (New) The sampling device of claim 7, wherein the cladding comprises a variation of section along a length of the cladding from the first zone of interaction to the second zone of interaction.

31. (New) The sampling device of claim 5, wherein the photo-detector is associated with a formatting element.